

***Ficus carpentariensis* – a new sandpaper fig for
northern Australia and a revision of the *F. opposita* complex
(Moraceae: *Ficus* subg. *Ficus* sect. *Sycidium* informal group *F. copiosa*)**

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Abstract

Dixon D.J. *Ficus carpentariensis* – a new sandpaper fig for northern Australia and a revision of the *F. opposita* complex (Moraceae: *Ficus* subg. *Ficus* sect. *Sycidium* informal group *F. copiosa*). *Nuytsia* 16(2): 269–284 (2007). The *Ficus opposita* Miq. complex is revised. Four taxa in three species are recognized, *F. opposita* from Queensland and Papua New Guinea, *Ficus aculeata* Miq. with two varieties, one, var. *aculeata* occurring across the tropical north of Australia, the other, var. *indecora* (Miq.) D.J. Dixon restricted to the Northern Territory and Western Australia. A new species *Ficus carpentariensis* D.J. Dixon which is endemic to the Northern Territory is described. A key to identification is provided along with distribution and habitat and typification notes. Type material has been lectotypified where necessary.

Introduction

There has been a growing body of research provided by Ramirez (1977), Berg (1989; 2003a–e; 2004a–c), Weiblen (2000) and Berg and Corner (2005) that support subgeneric changes for *Ficus* L. With the publication of the Flora Malesiana treatment of *Ficus* (Berg and Corner 2005) including the precursor papers (Berg 2003a–e; 2004a–c) formal recognition has been given to six subgenera within *Ficus*. These include the monoecious subgenera *Pharmacosycea* (Miq.) Miq. and *Urostigma* (Gasp.) Miq., the (gyno)dioecious subgenera *Ficus*, *Synoecia* (Miq.) Miq., and *Sycidium* (Miq.) Mildbr. & Burret and the subgenus *Sycomorus* (Gasp.) Miq., which contains both monoecious and dioecious species. This new arrangement of *Ficus* differs from that summarized by Corner (1965) by the elevation of section *Sycidium* of *Ficus* subg. *Ficus* to the rank of subgenus and the resurrection of subgenus *Synoecia* (Miq.) Miq. Corner (1960) discussed the recognition of a fifth subgenus that incorporated the sections *Kalosyce* and *Rhizocladus*, but retained them as sections within subgenus *Ficus* because of the close agreement of the floral characters with *Ficus* subg. *Ficus* and supposed absence of a unifying character. Berg (2003a) indicated that the subgenus *Synoecia*, incorporating some of the taxa suggested by Corner (1960) is unified by the two bracteoles that subtend the staminate flower. Berg and Corner (2005) in their adoption of six subgenera have moved the emphasis on identification from floral characters to vegetative characters. These changes have affected the placement of some of the Australian sandpaper figs, albeit without discussion.

In the treatments of Corner (1960, 1965), *Ficus opposita* and the other Australian sandpaper figs were placed in *Ficus* subg. *Ficus* sect. *Sycidium* subsect. *Sycidium* ser. *Scabrae* Miq. In the newly proposed classification of Berg and Corner (2005) and Berg (2003e), the section *Sycidium* is elevated to the rank of subgenus. Berg (2003e) further divided the subgenus into two sections, but below this rank indicated that there were 'several groups of evidently or presumably related species...none with clear demarcations'. Instead Berg (2003e) chose to recognise five informal groups which are primarily based on combinations of Corners (1960) subdivisions. Berg (2003e) placed *F. opposita* in the section *Sycidium*, *Ficus copiosa* informal group which comprises largely the series *Copiosae* Corner.

Ficus opposita and its associated infraspecific taxa have had a varied nomenclatural history. From 1848 when the species was first published by Miquel (1848) to the present, there have been various names published and iterations of infraspecific combinations. The treatment currently followed in Australia is essentially that originally published and summarized by Corner (1965) and followed by Chew (1989) with a slight modification by Henderson (1993). In 1965 and 1989 three infraspecific taxa were recognized, *Ficus opposita* Miq. var. *opposita*, *Ficus opposita* var. *indecora* (Cunn. ex Miq.) Corner, and *Ficus opposita* var. *aculeata* (Miq.) R.J.F. Hend. (var. *micracantha sensu* Chew 1989).

According to Chew (1989) *F. opposita sensu lato* is a widespread taxon, occurring across the tropical north of Australia and extending into eastern Malesia and New Guinea. Slight geographic cohesiveness was recognised for the infraspecific taxa, but identification was difficult with Chew stating that 'the species is highly variable and the three varieties recognised intergrade considerably and are difficult to distinguish'. Chew (1989) considered that the var. *opposita* was possibly also in the Northern Territory (NT), and New South Wales (NSW), as well as its known distribution of Queensland (Qld), eastern Malesia and New Guinea, var. *indecora* was essentially a western taxon centred in the northern NT and WA, and var. *micrantha (aculeata)* extended from Cape York in Qld across the tropical north to Western Australia (WA). Varietal identification was based on leaf and syconia dimensions and the density of pubescence associated with the adaxial and abaxial surface of the leaf. Complicating matters further was the recognition by Hyland *et al.*, (1999, 2003) of the closely related taxon *Ficus cumingii* var. *androbrotta* (Summerh.) Corner on Cape York Peninsula. This identification was based on the existence of narrow leafed material in Qld which was very similar to *F. cumingii* var. *androbrotta* from New Guinea (*sensu* Corner, 1965).

In the Berg and Corner (2005) Flora Malesiana treatment of *Ficus*, *F. opposita* is treated without infraspecific taxa. No discussion was provided for the reduction in the number of infraspecific taxa other than a statement in the introduction 'The task [of updating Corner's original unpublished manuscript] proved to be far more extensive and demanding than including recent collections and new data from recent publications...Taxonomic decisions had to be revised (species united or reinstated and the number of varieties strongly reduced)...'. Mention was made of the similarities between *F. opposita* and *F. cumingii* Miq., and the fact that they could be treated as subspecies. The similarities of *F. opposita* with the partly sympatric *Ficus wassa* Roxb., were also discussed. However, Berg and Corner (2005) provided a suite of characters that, coupled with the disjunct distributions of each taxon, allowed for identification and maintenance of these taxa at the rank of species. As part of this treatment though, *F. cumingii* var. *androbrotta* was synonymised under *F. opposita* along with the Australian infraspecific taxa. As the *F. opposita* complex has always been problematical, and because some material originating from the NT, could not be reliably placed with any Australian and Malesian material, a revision of the complex was undertaken.

Methods

Material was obtained on loan from the following herbaria: BM, BRI, CANB, DNA, K, L, LAE, MEL, NSW, NT, PERTH, PR, QRS, and U. Herbarium abbreviations follow Holmgren *et al.* (1990). In total 832 herbarium accessions, including spirit material, were examined. With the exception of *Ficus carpentariensis* D.J. Dixon all taxa have been examined in the field and across their respective distributional ranges. Material of *F. carpentariensis* has recently been collected during vegetation surveys in the Macarthur River Region of the NT. All type material has been seen unless stated to be *n.v.*

Taxonomy

Within this complex four taxa in three species are now recognized. These include *Ficus opposita* Miq., which is restricted to the east coast of Australia and New Guinea, *Ficus aculeata* Miq. with two varieties, var. *aculeata* and var. *indecora* (Miq.) D.J. Dixon, and the newly described *Ficus carpentariensis* D.J. Dixon which is endemic to the NT. The other Australian taxon in the informal *F. copiosa* group of Berg and Corner (2005) is *Ficus copiosa* which occurs in rainforests of Queensland's wet tropics and also extending into Malesia. The Australian taxa previously assigned to the series *Scabrae* were not placed by Berg and Corner (2005) in the new informal groups.

Key to species

1. Abaxial surface of leaves with sunken aerolae, leaf margins often distinctly aculeate..... **F. aculeata**
1. Abaxial surface of leaves with areolae not sunken, reticulations slightly raised **2**
2. Leaves ovate, slightly obovate, oblique, elliptic or lanceolate (trilobed) on coppice growth; syconia aculeate, scabrid, pilose **F. opposita**
2. Leaves narrowly elliptic, elliptic; syconia puberulous–pilose, occasionally villous never aculeate..... **F. carpentariensis**

Ficus aculeata Miq. *Lond. J. Bot.* 7: 426 (1848); *Ficus opposita* var. *aculeata* (Miq.) R.J.F. Hend., *Austrobaileya* 4: 119 (1993). *Type*: In Ora Boreali, (Novae Holl.?), Hb. Hook., (*lecto*: K, here designated; *isolecto*: K, U).

Ficus micracantha Miq., *Ann. Mus. Bot. Lugduno-Batavum* 3: 221 (1867); *Ficus aculeata* var. *micracantha* (Miq.) Benth., *Fl. Austral.* 6: 175 (1873); *Ficus opposita* var. *micracantha* (Miq.) Corner, *Gard. Bull. Singapore* 17: 471 (1960). *Type*: Cairncross Is., Qld, *F. Mueller* (*holo*: MEL; *iso*: U, L).

Tree to 15 m, dioecious. *Twigs* solid, with ascending scabrid, puberulous–pilose, villous hyaline hairs, occasionally pilose–aculeate, glabrescent. *Leaves* opposite or alternate, sometimes both conditions occurring on same individual, widely ovate, ovate, occasionally obovate, widely to narrowly elliptic, widely elliptic, margin recurved, rarely flat, aculeate; apex acute, rounded, obtuse–retuse; base oblique, rounded, obtuse, cordate. *Petiole* 2.5–38.0 mm long, scabrid or with ascending puberulous, pilose–

villous hyaline hairs, occasionally pilose-aculeate, shallowly channeled on the upper surface, flat gland present at junction of petiole and lamina. *Lamina* 17–182 mm long, 13–96 mm wide, adaxial surface smooth, scabrid, scabrid-aculeate; abaxial surface scabrid or occasionally aculeate along mid and lateral veins, grey pilose-villous, areolae sunken pit obscured by grey pilose-villous hairs or visible with puberulous-pilose hairs; cystoliths visible as raised dots on adaxial surface, crustaceous. *Lateral veins* 4–13 pairs, 44° – 90° , basal veins 29° – 75° . *Stipules* 4–15 mm long, with puberulous-pilose appressed hyaline hairs, caducous. *Syconia* axillary, ramiflorous, depressed globular, globular, 6.8–16.5 mm long, 6–18 mm in diameter, scabrid, pilose-villous, aculeate, dark maroon red at maturity. *Basal bracts* 3, with puberulous, pilose hyaline hairs, ciliate, persistent, occasionally evenly spaced along peduncle, or one becoming lateral on the wall of the syconium. *Peduncle* 2–10 mm long, occasionally sessile. *Male* florets ostiolar in 1 row, pedicellate with 4 or 5 tepals. *Stamens* one. *Female* and gall florets sessile and pedicellate, with 3–5 tepals. *Interfloral* bracts absent. (Figure 1)

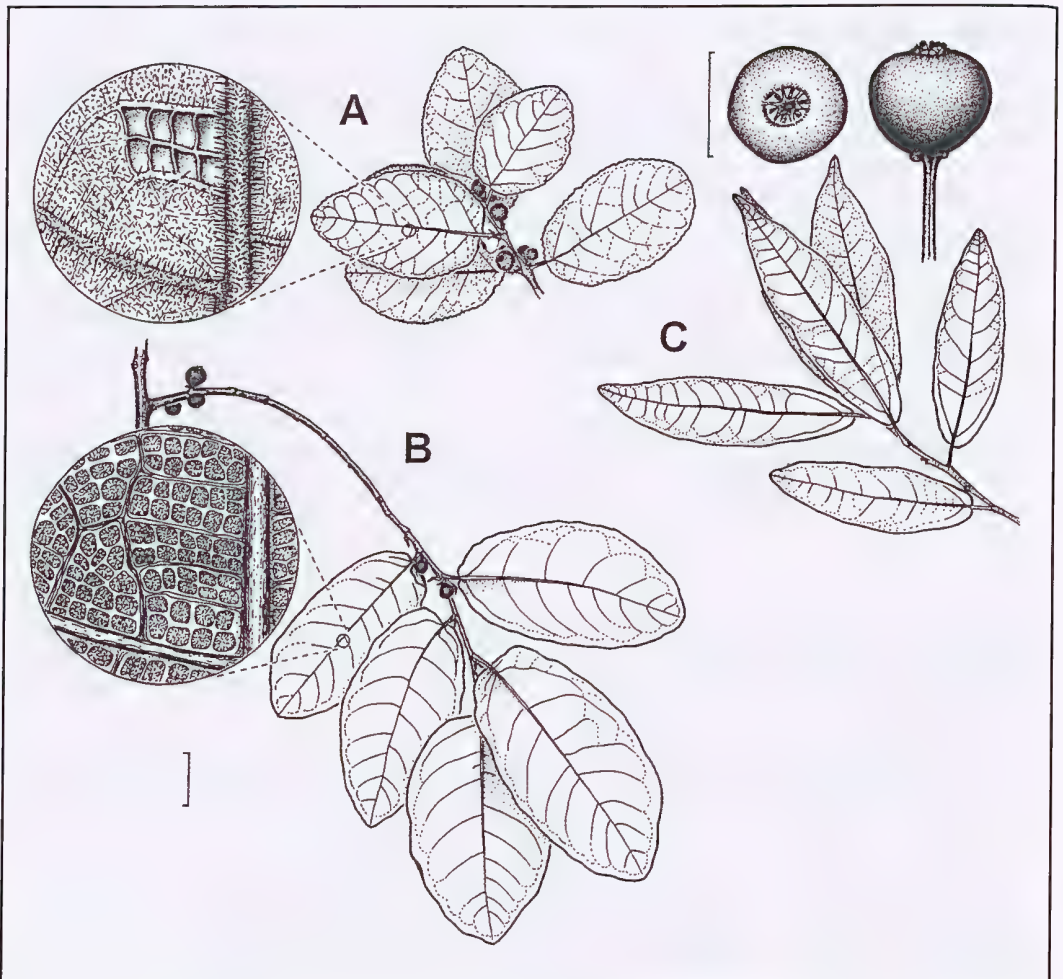


Figure 1. A–C. Leafy twigs and syconia of *Ficus aculeata* and *Ficus carpentariensis*. A–F. *aculeata* var. *aculeata*: fertile branch and underside of leaf with indumentum removed to reveal venation and sunken areolae. B–F. *aculeata* var. *indecora*: fertile branch and underside of leaf showing the hair fringed sunken areolae. C – *Ficus carpentariensis*: leafy twig and syconium. Scale bar = 2 cm for A and B and leafy twig of *F. carpentariensis*; and = 1 cm for syconium of *F. carpentariensis*.

Typification. A sheet of *Ficus aculeata* Miq., bearing a label in Miquel's hand exists at K even though Chew (1989, p.57) indicated that type material for this taxon was not designated. This specimen also has a label in Cunningham's hand indicating the north coast (N.C.) collection locality cited by Miquel (1848). This sheet has been chosen as the lectotype. Another sheet, also present at K, bears Cunningham's label with the same collection locality. This duplicate K specimen together with a U specimen consisting of a single leaf and syconia fragments are isolectotypes. It appears that Miquel had a habit of retaining one or two leaves from his 'type specimens' at his home institution (see also *F. micracantha* Miq.).

Chew (1989) indicated that the type of *Ficus micracantha* Miq. was at K. However, after consultation with the ABLO, Dr Roberta Cowan, no material of *F. micracantha* was located at K. *Ficus micracantha* material bearing a label in Miquel's hand has been located at U, while duplicate material has been found at MEL and L. I have no doubt that the MEL, L and U material is from one gathering and since the MEL specimen is the most complete and bears syconia, it is chosen as the holotype.

Notes. In deciding on the nomenclature for *Ficus aculeata*, I have been mindful of the synonymy already established at the specific rank for *F. orbicularis*, *F. indecora*, and *F. aculeata*. As these taxa were published in the same publication and on the same page (Miquel, 1848), and in my opinion are conspecific, each could be considered as having equal priority for specific recognition. However, Bentham (1873) treated *F. indecora* as a synonym of *F. orbicularis*, which by priority (see Art. 11.5 of the ICBN, Greuter *et al.* 2000) prevents the use of the name *F. indecora* if *F. orbicularis* is considered conspecific, which it is. This leaves *Ficus aculeata* and *F. orbicularis* as the competing names for the above taxon. Bentham (1873) stated that *F. aculeata* was very closely allied to *F. orbicularis* and pondered the notion that it was just a variety. Corner (1959) reduced *F. indecora* to a variety of *F. opposita* and placed *F. aculeata* in synonymy under his newly combined *F. opposita* var. *micracantha* (Miq.) Corner. In this same paper, Corner (*op. cit.*), *F. orbicularis* was also placed in synonymy under *F. opposita* var. *micracantha*. The nomenclature of *F. opposita* remained stable until Henderson (1993) quite rightly pointed out that the treatment provided by Chew (1989) neglected to take into consideration the change to the rules relating to autonyms which was established at the 1981 International Botanical Congress. In correcting the nomenclature of Chew (1989.), Henderson (1993) amended the taxonomy to reflect the status of autonyms, thus *F. opposita* var. *micracantha* became *F. opposita* var. *aculeata*.

Ficus aculeata Miq. is distinct from *Ficus opposita* Miq. which in Australia is essentially an east coast taxon. In order to retain some familiarity of names I have decided to use *F. aculeata* over *F. orbicularis* at the rank of species as the epithet *aculeata* is currently in use (see Henderson, 1993), and would at least be recognisable to those familiar with *Ficus* names in use. There are two varieties that can be distinguished as follows:

Key to varieties of *F. aculeata*

1. Abaxial surface of leaf densely covered with grey pilose-villous hairs obscuring aerolae..... var. **aculeata**
1. Abaxial surface of leaf with aerolae visible, hairs not obscuring aerolae..... var. **indecora**

Ficus aculeata Miq. var. **aculeata**

Twigs with ascending puberulous-pilose, villous hyaline hairs, occasionally pilose-aculeate, glabrescent. Leaves widely ovate, ovate, narrowly to widely elliptic, margin recurved, aculeate. Petiole 3–38 mm long, with ascending pilose-villous grey-hyaline hairs, occasionally pilose-aculeate. Lamina 19–149 mm long, 14.5–96.0 mm wide, adaxial surface scabrid-aculeate, abaxial surface grey pilose-villous, occasionally with mid and lateral veins aculeate. Lateral veins 4–10 pairs, 44°–90°, basal veins 29°–75°. Stipules 4–10 mm long. Syconia 6.8–16.5 mm long, 6–18 mm in diameter, pilose-villous, aculeate. Peduncle 2.5–8.5 mm long, occasionally sessile. (Figure 1 A, B)

Selected specimens examined. WESTERN AUSTRALIA: Creek 95 km N of Halls Creek on road to Turkey Creek, 17° 32' S, 127° 54' E, *Aplin, T.E.H.* 358 & *Cranfield, R.J.*, 24 Apr. 1985 (PERTH); 43.5 km by road SW of Bedford Downs Homestead, 65 km W of Great Northern Highway, 92 km NNW of Halls Creek, 17° 15' S, 127° 27' E, *Beauglehole, A.C.* 53731, 23 June 1976 (PERTH); Lake Argyle, S of Kununurra, 16° 01' 48" S, 128° 46' 42" E, *Dixon, D.J.* 452 & *Champion, I.G.*, 23 Dec. 1997 (DNA); Base of the Northern Carr Boyd ranges, bordering the Ord River, 15° 58' S, 128° 43' E, *Hartley, T.G.* 14421, 10 Mar. 1978 (CANB, PERTH); Cracticus Falls, Drysdale River National Park, N Kimberley, 14° 47' S, 127° 05' E, *Kenneally, K.F.* 4188, 10 Aug. 1975 (PERTH); Forest Creek, Drysdale River National Park, N Kimberley, 14° 39' S, 126° 57' E, *Kenneally, K.F.* 4541, 20 Aug. 1975 (CANB, PERTH); Old Halls Creek, 18° 14' S, 127° 46' E, *Morrison, H.A. s.n.*, 11 June 1970 (PERTH); c. 39 km S of the Forrest Creek crossing on the Duncan Highway, near boundary of Ord River and Nicholson River Stations, 17° 44' S, 128° 52' E, *Pullen, R.* 10812, 20 Apr. 1977 (BRI, CANB, MEL, PERTH); Hidden Valley, c. 3 km NE of Kununurra, E Kimberley, 15° 47' S, 128° 45' E, *Pullen, R.* 10.863, 25 Apr. 1977 (BRI, CANB, LE, PERTH); S base of Mount King, Durack Range, 17° 20' S, 127° 22' E, *Rodd, A.N.* 2858, 24 Oct. 1974 (NSW); Karunjie Station, Kimberley, 16° 17' S, 127° 12' E, *Rust, D.W.* 53, 01 Nov. 1954 (CANB); Minjiyurdji, limestone outcrop 1 km S of Bungle Bungle outcamp, 17° 21' S, 128° 21' E, *Scarlett, N.H.* 84.307, 01 July 1984 (MEL, NSW). NORTHERN TERRITORY: DARWIN AND GULF: Sir Edward Pellew Group, 15° 44' S, 136° 37' E, *Craven, L.A.* 3712, 08 Feb. 1976 (CANB); Borroloola Township, 16° 03' S, 136° 18' E, *Craven, L.A.* 4134, 05 June 1976 (CANB); 10 km N of Jim Jim Falls, 13° 11' S, 132° 50' E, *Craven, L.A.* 6082, 29 May 1980 (CANB); Koolatong River Floodplain near mouth, 13° 13' 33" S, 135° 54' 01" E, *Cowie, I.D.* 7357, 17 Oct. 1996 (BRI, DNA); 44 km SE Oenpelli, 12° 34' S, 133° 23' E, *Dunlop, C.R.* 4934, 15 June 1978 (DNA, NSW); near head of Kilgour River, 16° 45' S, 136° 01' E, *Hill, G.F.* 554, 02 Nov. 1911 (MEL); Wessel Islands, 11° 11' S, 136° 44' E, *Latz, P.K.* 3247, 29 Nov. 1972 (CANB, K); Nitmiluk National Park, Edith Falls area, 14° 09' 36" S, 132° 11' 28" E, *Michell, C.R.* 4158, 09 May 2002 (BRI, DNA); Flying Fox Creek campsite, where track to camp leaves main road, 14° 10' 06" S, 133° 44' 06" E, *Muir, C. s.n.*, 28 July 1993 (DNA, MEL); Nangalala (White Star Landing), 12° 18' S, 134° 59' E, *Reeve, H.* 190, 19 May 1972 (CANB); Groote Eylandt, 1 km S of mouth of the Emerald River, 14° 06' S, 136° 26' E, *Russell-Smith, J.* 2899 & *Lucas, D.*, 23 July 1987 (DNA, MEL); Baniwurruldalk, Croker Island, 11° 06' S, 132° 33' E, *Russell-Smith, J.* 3639 & *Lucas, D.*, 07 Oct. 1987 (BRI, DNA); 14 km N of Mataranka on Stuart Highway, 14° 50' S, 132° 58' E, *Tindale, M.D.* 6079 & *Dunlop, C.R.*, 09 July 1979 (NSW); Yambarran Range, 19 km NE Mount Millik, 15° 05' 15" S, 130° 28' 45" E, *Walsh, N.G.* 3832 & *Leach, G.J.*, 15 May 1994 (DNA, MEL); Numbulwan Mission, Rose River, via Darwin, 14° 17' S, 135° 44' E, *Webb, L.J.* 10277 & *Tracey, G.J.* (CANB); 16 Mile Cave Reserve, S of Katherine, 14° 32' S, 132° 15' E, *Webb, L.J.* 12272 & *Tracey, G.J.*, 01 May 1978 (BRI, CANB, DNA). BARKLY TABLELANDS: Settlement Creek, 17° 18' S, 137° 47' E, *Brass, L.J.* 259, 01 Jan. 1923 (CANB); Old Kiana Homestead Spring, 17° 07' S, 136° 02' E, *Russell-Smith, J.* 6234 & *Lucas, D.*, 29 Oct. 1988 (DNA). VICTORIA RIVER: Gregory National Park, near Matt Wilson Creek, 15° 31' 38" S, 131° 08' 36" E, *Cowie, I.D.* 9188 & *Smith, R.*, 05 May 2001 (B, BRI, DNA, MEL). QUEENSLAND: COOK: Horn Island, 10° 35' S, 142° 15' E, *Cameron, E.* 2023, 23 July 1975,

(QRS); Edward River Aboriginal Reserve, 26.8 km S of Edward River, Musgrave road on track to Bull Crossing, 14° 59' S, 141° 42' E, *Clarkson, J.R.* 3553, 13 Oct. 1980 (BRI, K, L, MO, PERTH, QRS); Forty Mile Scrub, 18° 07' S, 144° 50' E, *Cooper, W.* 1648 & *Cooper, W.*, 13 Jan. 2002 (QRS); State Forest Reserve 185, Platypus Logging Area, 17° 09' S, 145° 34' E, *Gray, B.* 2606, 01 June 1982 (QRS); W side of Cape York road \pm 3 km N of turnoff near Bamaga, 10° 52' S, 142° 24' E, *Jobson, P.C.* 755 & *Power, G.C.*, 27 Aug. 1989 (BRI, MEL); Davies Creek, Mareeba, 17° 01' S, 145° 34' E, *Jones, W.T.* 1326, 24 Aug. 1959 (CANB); Stannary Hills turnoff, 19 km from Herberton, 17° 20' S, 145° 13' E, *Smith, L.S.* 11248, 13 Sep. 1960 (DNA); Near Galbraith, 16° 20' S, 141° 30' E, *Whitehouse, F.W. s.n.*, 01 Jan. 1946 (BRI). BURKE: Karumba, 17° 29' S, 140° 50' E, *Blake, S.T.* 15134, 14 Aug. 1943 (BRI); Between Tully and Massacre Inlets, Gulf of Carpentaria, 16° 12' S, 138° 10' E, *Hyland, B.P.M.* 13571, 22 Aug. 1988 (QRS); Doomadgee, 17° 56' S, 138° 49' E, *Fawssett, L.* 41, 11 Aug. 1961 (BRI); Duchess Road, 6.8 km S of Mount Isa (by air), 20° 47' 06" S, 139° 29' 57" E, *Fraser, A.* 251, 14 Nov. 1997 (CANB, DNA); Lagoon Creek, 17° 33' S, 138° 06' E, *Melville, S.* 1056, 24 June 1990 (BRI); Sweers Island, 17° 06' S, 139° 37' E, *Mueller, F.J.H.* 2, (L, MEL); Near Morestone Station, 19° 32' S, 138° 22' E, *Perry, R.A.* 1027, 28 May 1948 (CANB, MEL); Armraynald Station, W of the Leichhardt River and c. 40 km SE of Burketown, 17° 57' S, 139° 46' E, *Pullen, R.* 8955, 28 Apr. 1974 (BRI, CANB); Adels Grove, near Lawn Hill Creek, 18° 41' S, 138° 32' E, *Rodd, A.N.* 3204, 23 May 1976 (BRI, NSW); Murrays Spring, 12 km by road W of Musselbrook mining camp, 175 km N of Camooweal, 18° 35' S, 138° 02' E, *Thomas, M.B.* MRS61C & *Johnson, R.W.*, 24 Apr. 1995 (BRI, DNA); Normanton, 17° 40' S, 141° 04' E, *Waterhouse, B.M.* 5131, 22 Mar. 1999 (BRI, DNA); Cloncurry, 20° 42' S, 140° 30' E, *Blake, S.T.* 10129, 08 Nov. 1935 (BRI).

Distribution. A widespread variety of *Ficus aculeata* occurring from Cape York in Queensland across tropical Australia to the Kimberley region and south to the Pilbra region of WA. (Figure 2)

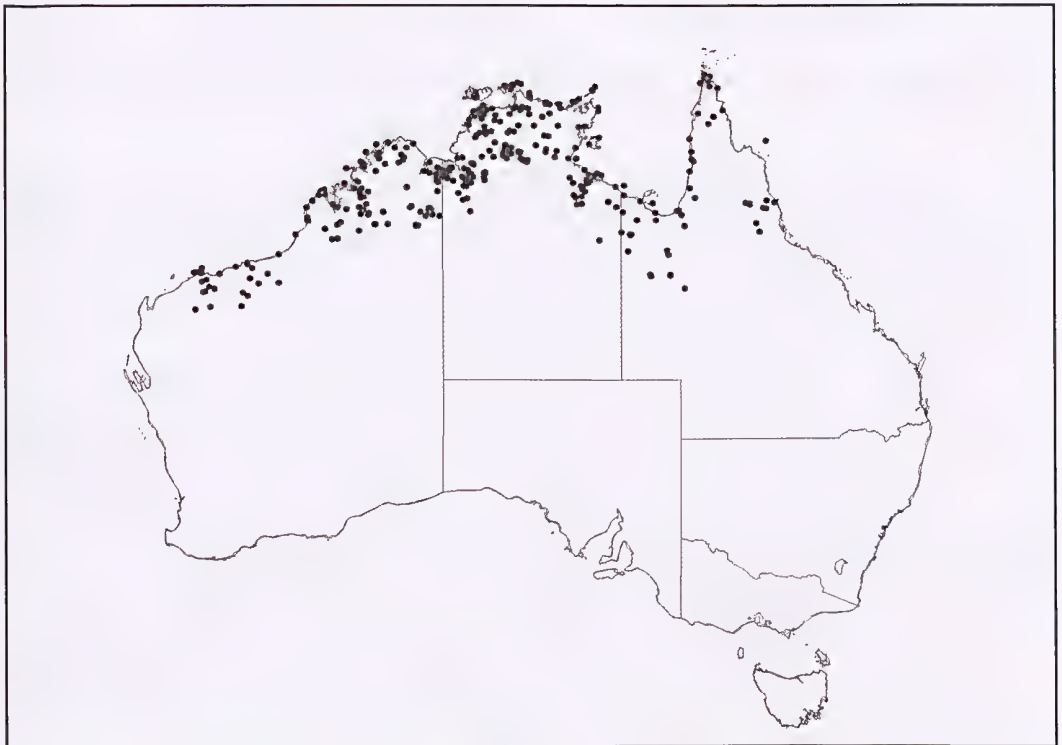


Figure 2. The distribution of *Ficus aculeata* var. *aculeata* based on available collection data.

Habitat. *Ficus aculeata* var. *aculeata* has diverse habitat preferences and has been recorded from hummock grassland, riparian forest, eucalypt woodland, vine thickets, *Melaleuca* shrubland and woodland, *Allosyncarpia* forest, and floodplain margins. It is most commonly encountered in eucalypt woodland. No particular substrates are favoured with records indicating that the variety has been found on alluvium, loams, and heavy clay soils, coastal sand and calcareous dunes, and soils derived from granite, limestone, laterite, quartz, and basalt.

Affinities. This variety could be confused with *Ficus opposita* where the two co-occur, however, vegetative characters allow for easy identification. *Ficus aculeata* var. *aculeata* has a dense covering of whitish pilose hairs on the abaxial surface that obscure the lamina surface and the sunken areolae. *Ficus opposita* can have a dense covering of soft pilose hairs, but these are never as intensely white as in var. *aculeata*, and the areolae are never sunken. The margin of var. *aculeata* is often harshly aculeate. The trilobed condition found commonly in *Ficus opposita* from the east coast is a result from regrowth after damage sustained to an individual and has never been recorded from *F. aculeata* and its two varieties.

Pollinator wasp. The pollinator wasp species is unknown.

Ficus aculeata* var. *indecora* (Miq.) D.J. Dixon, *stat. et comb. nov.

Basionym: *Ficus indecora* Cunn. ex Miq., *London J. Bot.* 7: 426 (1848); *Ficus opposita* var. *indecora* (Cunn. ex Miq.) Corner, *Gard. Bull. Singapore* 17: 471 (1959). *Type:* Careening Bay, [WA.], A. Cunningham (*holo:* K; *iso:* BM; U).

Ficus orbicularis Miq. *London J. Bot.* 7: 426 (1848). *Type:* North West Coast [WA.], Cunningham (*lecto:* K, here designated; *isolecto:* U).

Ficus beckleri Miq. *J. Bot. Neerl.* 1: 241 (1861). *Type:* Fitzmaurice River, Arnhemland, [NT], Beckler (*holo:* U; *iso:* L).

Twigs with ascending puberulous, scabrid hairs, glabrescent. *Leaves* widely to narrowly elliptic, ovate, occasionally obovate, margin recurved, rarely flat, aculeate. *Petiole* 2.5–25.0 mm long, scabrid or with ascending puberulous hyaline hairs. *Lamina* 17–182 mm long, 13–81 mm wide, adaxial surface smooth, scabrid, abaxial surface scabrid along mid and lateral veins. *Lateral veins* 4–13 pairs, 31°–57°, basal veins 43°–83°. *Stipules* 5.5–15.0 mm long. *Syconia* 7–14 mm long, 6.0–13.5 mm in diameter, scabrid, aculeate, occasionally pilose. *Peduncle* 2–10 mm long. (Fig. 1, C & D)

Selected specimens examined. WESTERN AUSTRALIA: Windjana Gorge, Lennard River, Napier Range, 17° 19' S, 124° 48' E, *Beaglehole*, A.C. 11223, 04 Aug. 1965 (MEL, PERTH); Broome, new jetty area, 17° 58' S, 122° 14' E, *Beaglehole*, A.C. 11239, 07 Aug. 1965 (MEL, PERTH); Cape Bossut, 18° 42' S, 121° 37' E, *Butler*, W.H. s.n., Aug. 1963 (PERTH); c. 7 miles S of Yarrie, 20° 46' S, 120° 12' E, *Demarz*, H. 5731, 16 Oct. 1975 (PERTH); Mount Hart Homestead on Barker River, NW Kimberley, 16° 50' S, 124° 55' E, *Edinger*, D.J. 458, 24 June 1987 (PERTH); Goody Goody, 17° 20' S, 123° 44' E, *Fitzgerald*, W.V. 258, Apr. 1905 (PERTH); Near Goose Hill, E Kimberley, 15° 34' S, 128° 21' E, *Fitzgerald*, W.V. 1598, Sep. 1906 (PERTH); De Grey River, 20° 21' S, 119° 20' E, *Gardner*, C.A. 8070, Sep. 1946 (PERTH); King Sound, 17° 10' S, 123° 30' E, *Hughan*, A. s.n., (MEL); Walcott Inlet, 16° 27' S, 124° 50' E, *Hyland*, B.P.M. 13559, 18 June 1988 (PERTH, QRS); Between Lombadina Mission and Pender Bay, Dampier Peninsula, W Kimberley Coast, 16° 37' S, 122° 50' E, *Kenneally*, K.F. 6207, 28 Apr. 1977 (PERTH); Fenelon Island off Admiralty Gulf, N Kimberley Coast, 14° 08' S, 125° 42' E, *Kenneally*, K.F. 6409, 27 July 1977 (CANB, K, PERTH); Hearson Cove, Burrup Peninsula, 20° 38' S,

116° 48' E, *Kenneally, K.F.* 7296, 23 July 1980 (PERTH); Kalumburu, 14° 17' S, 126° 38' E, *Reim, H.* 18, Oct. 1968 (PERTH); Ripon Hills, 36 km S of Warrawagine Homestead, c. 80 km SE of Shay Gap, 21° 09' 00" S, 120° 45' 35" E, *Newbey, K.R.* 10517, 15 July 1984 (PERTH); Legendre Island, Dampier Archipelago, 20° 23' S, 116° 52' E, *Royce, R.D.* 7325, 10 June 1962 (PERTH); Tickalara Track, ± 2.5 km S of Bungle Bungle outcamp near crossing of unnamed ephemeral creek, SE Kimberley, 17° 22' S, 128° 20' E, *Scarlett, N.H.* 84-323, 01 July 1984 (PERTH); Harding River, Large pool below Lockyer's Pool, 20° 59' S, 117° 07' E, *Weston, A.S.* 12774, 15 Sep. 1981 (PERTH); On Diamond field track near Ellendale Station, W Kimberley, 17° 39' S, 124° 55' E, *Willing, T.* 132, 21 Sep. 1984 (BRI, PERTH); Coronation Island, Bonaparte Archipelago, 15° 00' S, 124° 55' E, *Wilson, P.G. s.n.*, 23 May 1972 (PERTH). NORTHERN TERRITORY: DARWIN AND GULF: Adelaide River, 13° 14' S, 131° 07' E, *Blake, S.T.* 16689, 06 Aug. 1946 (BRI); Holmes Jungle, 12° 24' S, 130° 55' E, *Booth, R.* 245, 06 Jan. 1995 (DNA); Mann River, near Gamarrgawan outstation, 12° 42' 01" S, 134° 03' 21" E, *Brennan, K.G.* 3575, 13 Nov. 1997 (DNA); Kapalga, 12° 35' S, 132° 25' E, *Collins, R.* 64, 31 July 1976 (DNA); Bradshaw Creek area; 10 km NE Dorisvale, 14° 28' S, 131° 24' E, *Cousins, S.N.* 43, 30 Nov. 1978 (DNA, NT); Adelaide River scenic drive off Stuart Highway, 186 km N of Katherine, 13° 25' 53" S, 131° 10' 20" E, *Dixon, D.J.* 468 & *Champion, I.G.*, 28 Oct. 1996 (DNA); Finnis River Station, 12° 52' 04" S, 130° 21' 17" E, *Harwood, R.K.* 171 & *Mangion, C.P.*, 19 Aug. 1997 (DNA); Smith Point, Cobourg Peninsula, 11° 10' S, 132° 10' E, *Must, J.* 832, 08 Oct. 1971 (DNA, L); Horns Creek, 12° 36' S, 131° 06' E, *Rankin, M.O.* 1540, 08 Nov. 1978 (DNA); Pioneer Beach area, 12° 41' S, 130° 37' E, *Rankin, M.O.* 2224, 06 May 1979 (DNA); Daves Point Area Woolner Station, 12° 19' S, 131° 31' E, *Rankin, M.O.* 2499, 25 June 1980 (DNA); Fountain Head Sidings, 13° 28' S, 131° 28' E, *Robinson, C.S.* 618, 23 June 1964 (DNA); Flora River Conservation Reserve, 14° 45' 42" S, 131° 36' 03" E, *Short, P.S.* 4609 & *Dunlop, C.R.*, 09 Oct. 1996 (DNA); 4 km E of Jim Jim turnoff on Arnhem Highway, 12° 58' S, 131° 55' E, *Webb, L.J.* 12269 & *Tracey, G.J.*, 01 May

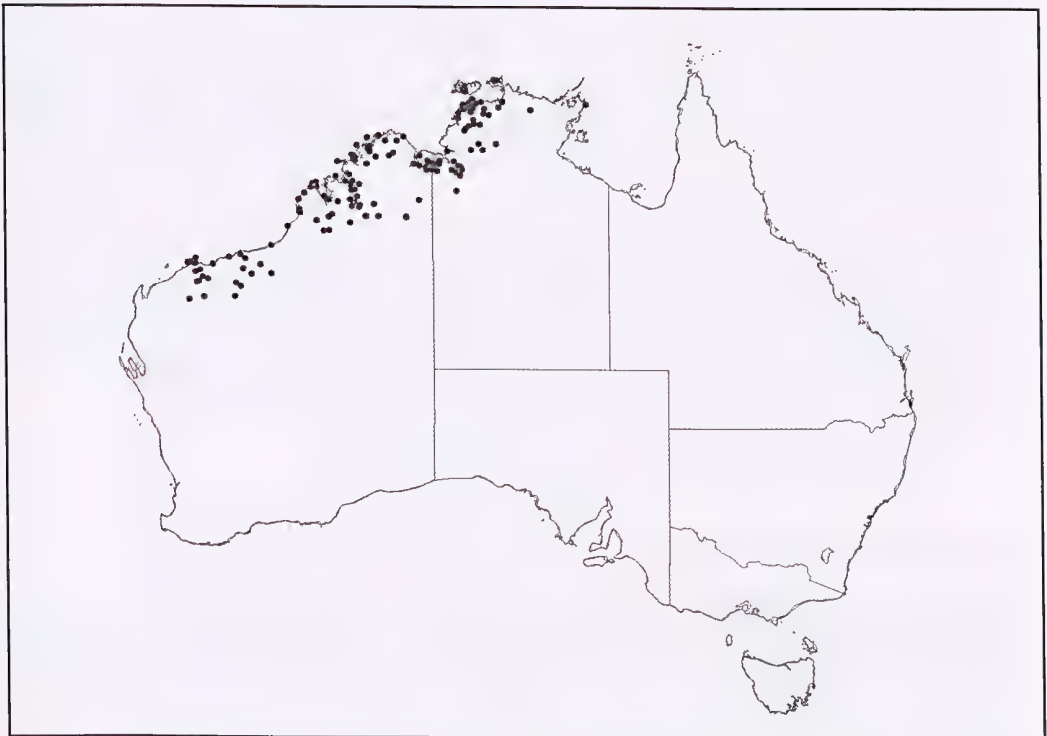


Figure 3. The distribution of *Ficus aculeata* var. *indecora* based on available collection data.

1978 (BRI); Melville Island, Fort Dundas, 11° 46' S, 130° 40' E, *Wightman, G.M.* 2951, 29 May 1986 (DNA); Daly River Mission Area, 13° 40' S, 130° 43' E, *Wightman, G.M.* 5266, 03 Apr. 1991 (DNA). VICTORIA RIVER: Gregory National Park; adjacent to Wickham River, 16° 51' 27" S, 130° 13' 52" E, *Cowie, I.D.* 7774, 05 June 1998 (DNA); Augustus waterhole on road to Spirit Hills from Kununurra, 15° 28' 39" S, 129° 15' 27" E, *Dixon, D.J.* 935 & *Kerrigan, R.A.*, 25 Oct. 2001 (B, DNA); Gregory National Park, Drovers Rest, 15° 55' S, 130° 15' E, *Wightman, G.M.* 6819, 17 Oct. 1996 (DNA); Bradshaw Station; Barramundi Pump, 15° 20' S, 130° 06' E, *Wightman, G.M.* 6966, 03 June 1997 (DNA).

Distribution. *Ficus aculeata* var. *indecora* occurs predominantly on the western side of the top end of the NT, across to the Kimberley region and south to the Pilbara region of WA. There is one collection from the Gove area of eastern Arnhem Land. (Figure 3)

Habitat. Open eucalypt woodland, deciduous vine thicket, grassland, riverine vegetation, Pindan, and *Melaleuca* woodland are the frequently recorded habitats of this taxon. A large number of collections have been collected from laterite formations, or soils derived from laterite. Other substrates from which this variety has been collected include sandstone, cracking clays, loams, basalt, limestone, dolomite, bauxite, sand and calcareous coastal dunes, and heavy soils fringing saline areas.

Typification. Two sheets, one housed at K, the other at U, compete for type status for *Ficus orbicularis* Miq. As was Miquel's practice, a leaf was retained at his home institution and hence the U sheet consists of a single leaf and a bag containing fragments of a syconium. The K sheet consists of four leafy twigs and associated labels. One twig (top left hand corner) bears a label in Miquel's hand, the Hb. Hook. 1867 stamp and a tag in Cunningham's hand indicating his manuscript name and the collection locality. Presumably Professor Corner delineated this portion of the K sheet as the type although his annotation slip does not indicate this. I am accepting this element of the K sheet as the holotype even though another of Allan Cunningham's labels with North West Coast (N.W.C.) is in the bottom left corner. These elements are excluded as there is another Cunningham label giving a further location as Enderby Island, Dampier Archipelago. Given the fact that Miquel cited more precise localities when they were available on the specimen (see type details of *Ficus indecora*), I find it impossible to believe that he would not have cited the Enderby Island element in the protologue if he had indeed seen it.

Affinities. This variety can be easily distinguished from var. *aculeata* by the absence of hairs obscuring the sunken areolae. The orifice of the areola may be fringed with hairs, but the leaf surface is never obscured by hairs as in var. *aculeata*. Material treated as *Ficus scobina* Benth., by Wheeler (1992) in the Flora of the Kimberley Region is actually *F. aculeata* var. *indecora*. *Ficus scobina* is endemic to the NT. The leaf (*Hyland, B.P.H.*, 25507) and florets (*Hyland, B.P.H.*, 25438) images provided by *Hyland et al.* (2003) under *Ficus opposita* var. *indecora* are *F. aculeata* var. *indecora*.

Pollinator wasp. The pollinator of *F. aculeata* var. *indecora* is unknown.

***Ficus carpentariensis* D.J. Dixon, sp. nov.**

Species *Fico aculeato* affinis sed ea venatione elevata reticulata in pagina abaxiali folii, areolas depressas *Fico aculeatae* non habens, pilis aculeatis in margine folii destituta, pedunculo gracili syconii, folio coriaceo (*F. aculeata* folia crustacea habet) distinguenda; ad ripas fluviorum.

Typus: 30 km N of Ngukurr, 14° 24' S 134° 43' E, 25 November 1987, *Russell-Smith, J.* 4168 & *Lucas, D.* (*holo:* DNA; *iso:* MEL, NSW).

A species with affinities to *Ficus aculeata* Miq. from which it can be distinguished by the raised reticulate venation on the abaxial leaf surface compared to the sunken areola of *F. aculeata*, the lack of aculeate hairs on the leaf margin, the slender peduncle of the syconium, the coriaceous texture of the leaf compared to the crustaceous texture of *F. aculeata*.

Tree to 12 m, dioecious. *Twigs* solid, with ascending puberulous-pilose hyaline hairs, occasionally scabrid, glabrescent. *Leaves* opposite or alternate, narrowly elliptic to elliptic, margin recurved, aculeate or smooth, apex acute, base cuneate, oblique, rounded, obtuse, occasionally truncate. *Petiole* 6.0–22.5 mm long, with ascending puberulose-pilose hyaline hairs, occasionally scabrid, channeled on the upper surface, flat gland present at junction of petiole and lamina. *Lamina* 42–188 mm long, 16.5–65.0 mm wide, adaxial surface scabrid, occasionally aculeate, abaxial surface scabrid, puberulous-pilose, occasionally villous, with raised reticulate venation, cystoliths visible as raised dots on adaxial surface, coriaceous. *Lateral veins* 11–18 pairs, 49°–72°, basal veins 33°–53°. *Stipules* to 12 mm long, with puberulous-pilose appressed hyaline hairs, caducous. *Syconia* axillary, globular, 11–21 mm long, 10–11.5 mm in diameter, puberulous-pilose, occasionally villous. *Basal bracts* 3, with puberulous hyaline hairs, persistent, occasionally evenly spaced along peduncle. *Peduncle* 6.5–14.0 mm long. *Male* florets ostiolar in 1 or 2 rows, pedicellate with 4 or 5 tepals. *Stamens* one. *Female* and gall florets sessile and pedicellate, with 5 or 6 tepals. *Interfloral* bracts absent. (Figure 1 E, F)

Specimens examined. NORTHERN TERRITORY: DARWIN AND GULF: Kakadu National Park, Koolpin Gorge day use area, 13° 29' 55" S, 132° 34' 23" E, Brennan, K.G. 1602, 20 Nov. 1991 (DNA); Abner Range; 6 km NE of Cape Crawford Hotel, 16° 41' S, 135° 47' E, Brock, J. 486, 29 Jan. 1989 (DNA); 20 km W of Wollgorang Homestead, Plot 1418, 17° 12' 02" S, 137° 42' 34" E, Harwood R.K. 536, 30 Sep. 1998 (DNA); Elsey National Park, Botanical Walk, 14° 56' 27" S, 133° 08' 19" E,



Figure 4. The distribution of *Ficus carpentariensis* based on available collection data.

Leach, G.J. 3918, 30 Nov. 1993 (BRI, CANB, DNA); Koolpin Creek, 13° 29' S, 132° 25' E, *Rankin, M.O.* 1612, 28 Nov. 1978 (CANB, DNA, MEL); 30 km N of Ngukurr, 14° 28' S, 134° 43' E, *Russell-Smith, J.* 4168, 25 Nov. 1987 (DNA, NSW, MEL); 1 km SW of Angus Spring, Hodgson Downs, 15° 08' S, 134° 27' E, *Russell-Smith, J.* 6650 & *Lucas, D.*, 17 Jan. 1989 (BRI, DNA, K, MEL); Robinson River Station, Nunns Spring, 16° 45' S, 136° 58' E, *Wightman, G.M.* 5452, 16 Aug. 1991, (DNA).

Distribution. *Ficus carpentariensis* is endemic to the Northern Territory, Australia. (Figure 4)

Habitat. It is frequently associated with riparian vegetation or monsoon forest associated with sandstone.

Conservation status. *Ficus carpentariensis* has been evaluated as least concern under the IUCN guidelines. It is relatively widespread in the NT and is expected to be more common than current collections indicate.

Etymology. The epithet is in reference to this species proximity to the Gulf of Carpentaria.

Affinities. *Ficus carpentariensis* is an uncommonly collected species closely related to *Ficus aculeata*. It can be distinguished from *F. aculeata* by the narrowly elliptic to elliptic leaves, the longer peduncle of the syconium, and the raised reticulate venation as opposed to the sunken areolae of *F. aculeata*. *Ficus aculeata* is predominantly a woodland species, while *F. carpentariensis* is associated with riparian and monsoon forests.

Notes. This species has previously appeared on the NT checklist of vascular plants as *Ficus* D17207 Roper River, *Ficus* D17207 *carpentariensis* and *Ficus* sp. *carpentariensis* (W.B. Spencer 01/Jul/11).

Pollinator wasp. The pollinator wasp of *F. carpentariensis* has not been collected.

Ficus opposita Miq. *London J. Bot.* 7: 426 (1848). *Type:* Bremer River, [Qld], 1829, *C. Fraser* 101 (*holo:* K; *iso:* U).

Ficus fitzalanii Miq. *J. Bot. Neerl.* 1: 242 (1861). *Type:* Cape Cleveland, Qld, *E. Fitzalan s.n.* (*holo:* U).

Ficus conjugata Miq. *Ann. Mus. Bot. Lugd. Bat.* 3: 222 (1867). *Type:* Java, *De Vriese s.n.* (*holo:* U, photo seen).

Ficus xerophila Domin, *Biblioth. Bot.* 89: 14 (1921). *Type:* Smelling Bluff, near Chillagoe, Qld, ii.1910, *K. Domin s.n.* (*holo:* PR).

Ficus yarrabensis Domin, *Biblioth. Bot.* 89: 15 (1921). *Type:* Yarraba, Qld, i.1910, *K. Domin s.n.* (*holo:* PR).

Ficus apolepomena Summerh. *J. Arnold Arb.* 10: 151 (1929). *Type:* Bisiatabu, New Guinea, 6/xi/1925, *L.J. Brass* 575 (*holo:* K; *iso:* BRI, photo seen).

Ficus branderhorstii Diels, *Bot. Jahrb. Syst.* 67: 201 (1936). *Type:* Kabatiel, Southern New Guinea, 6.xii.1907, *Branderhorst* 257 (*holo:* K; *iso:* L photo seen, ?BO).

Tree to 15 m, dioecious. *Twigs* solid, with ascending scabrid-aculeate, puberulous-pilose, hyaline hairs, glabrescent. *Leaves* opposite or alternate, sometimes both conditions occurring on same individual, ovate, slightly obovate, oblique, elliptic, lanceolate, (trilobed on regrowth), margin recurved, revolute, aculeate, dentate-glandular, entire; apex acute, rounded, obtuse; base oblique, rounded, obtuse, cordate. *Petiole* 6–48 mm long, aculeate, scabrid or with ascending puberulous-pilose hyaline hairs, occasionally pilose-aculeate, glabrescent or occasionally glabrous, shallowly channeled on the upper surface. *Lamina* 33–237 mm long, 15–108 mm wide, adaxial surface smooth, scabrid, scabrid-aculeate,

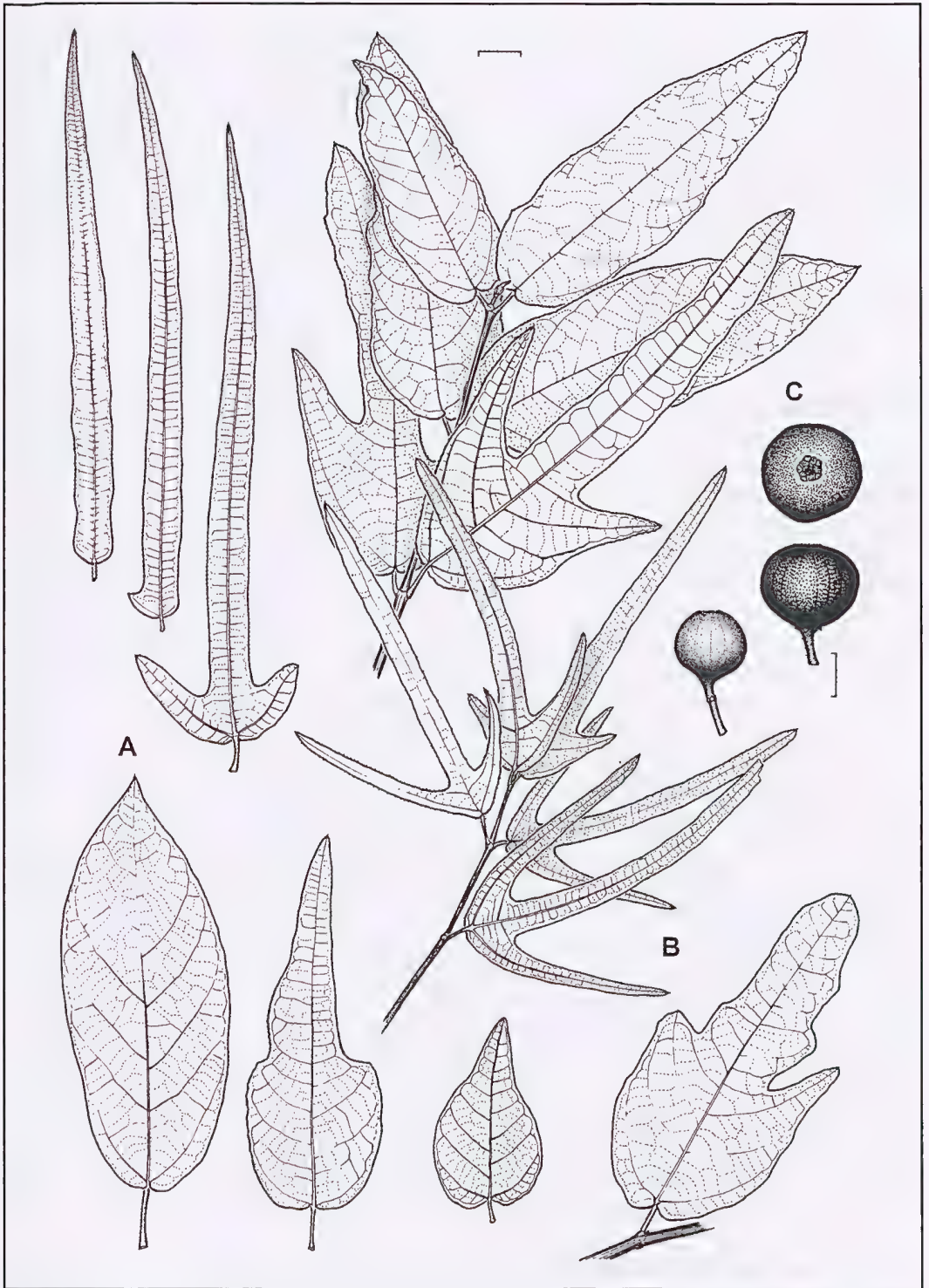


Figure 5. A–C. *Ficus opposita*. A – six leaves showing variation evident on one specimen (Bancroft, E.J. 1654; NSW); B – Leafy twigs showing transition from trilobed to typical leaf shape (Dixon, D.J. 382, DNA). C – Syconia, top two (Dixon, D.J. 6, DNA), bottom syconium showing stipitate form (Dixon, D.J. 10, DNA). Scale bar A and B = 2 cm. Scale bar C = 1 cm.

pilose, occasionally puberulous-pilose along mid and lateral veins, glabrescent, occasionally glabrous; abaxial surface scabrid, scabrid-aculeate, sometimes only along mid and lateral veins, puberulous-pilose; cystoliths visible as raised dots on adaxial surface, crustaceous. *Lateral* veins 4–13 pairs, 40°–78°, basal veins 26°–74°. *Stipules* 7–14 mm long, with puberulous-pilose appressed hyaline hairs, caducous. *Syconia* axillary, ramiflorous, broadly ovoid, occasionally constricted above basal bracts making peduncle appear longer, 8.8–19.2 mm long, 11.0–22.5 mm in diameter, scabrid, pilose, aculeate. *Female* plants with dark maroon-red fleshy syconia; male plants with green and maroon-red striped dry syconia at maturity. *Basal* bracts 3, with puberulous-pilose hyaline hairs, persistent or caducous, occasionally one becoming lateral on the wall of the syconium. *Peduncle* 0.0–10.0 mm long. *Male* florets ostiolar, pedicellate with 4–6 tepals. *Stamens* one. *Female* and gall florets sessile and pedicellate, with 3–5 tepals. *Interfloral* bracts absent. (Figure 5)

Selected specimens examined. PAPUAN NEW GUINEA: Sudest Island, Joe Landing., *Brass, L.J.* 27720, 17 Aug. 1956 (L, LAE); West Point, Sudest Island, Milne Bay District, *Henty, E.E.* 27105, 8 Nov. 1965 (A, BO, BRI, CANB, K, L); Brown River, Port Moresby., *Kairo, A.* 35621 & *Streimann, H.*, 3 Jan. 1967 (A, BISH, BO, BRI, CANB, K, L); Goragatabu Creek area, 15 miles N of Port Moresby, Central District, *Pullen, R.* 6758, 18 Apr. 1967 (CANB, L, LAE); Nazareth Mission, Laloki River, Port Moresby sub-district, Central District, *Streimann, H.* 51639 & *Kairo, A.*, s.dat. (A, BISH, BRI, CANB, K, L, NSW, PNH, SING, US). QUEENSLAND; COOK: Melville Range, c. 11 km SSW of Cape Melville, 14° 16' S, 144° 27' E, *Clarkson, J.R.* 5420, 10 June 1984 (BRI, L, NSW, QRS); 27.3 km along Mount Windsor road, 16° 18' S, 145° 05' E, *Dixon, D.J.*, 365, 9 Dec. 1996 (DNA); Mungana National Park, NW of Chillagoe, 17° 05' S, 144° 23' E, *Forster, P.I.* PIF18591 & *Ryan, T.*, 14 Feb. 1996 (QRS). BURKE: 5 km NW of Stirling Station, 103 km NE of Normanton, 17° 11' S, 141° 42' E, *Ollerenshaw, P.* 1470 & *Kratzing, D.*, 16 July 1974 (BRI, CANB, MO). NORTH KENNEDY: Great Basalt Wall, Southwick, 19° 54' S, 145° 37' E, *Fensham, R.J.* 18, 7 June 1992 (BRI); Taravale near Hell Hole Creek, 0.5 km E of Homestead, 19° 07' S, 146° 05' E, *Jackes, B.R.* 8749, 22 Mar. 1987 (BRI); Proserpine River, 7 km ESE of Proserpine, 20° 25' S, 148° 38' E, *Sharpe, P.R.* 4203, 11 Nov. 1985 (BRI). SOUTH KENNEDY: 55 km SW of Sarina on Wandoo Station at the confluence of Three-mile Creek and Funnel Creek, 21° 43' S, 149° E, *Dixon, D.J.* 85, 26 Jan. 1993 (DNA); Slade Point Reserve, off Green Arrow Track, 21° 04' S, 149° 13' E, *Champion, I.G.* 1387, 17 Aug. 1996 (DNA). LEICHHARDT: Bee Creek ex Road to Lake Eliphinstone, 21° 30' S, 148° 14' E, *Dixon, D.J.* 40 & *Champion, I.G.*, 11 Jan. 1996 (DNA). BURNETT: Castle Mountain, c. 30 km N of Monto, 24° 39' S, 151° E, *Stanley, T. s.n.* & *Ross, E.M.*, 1 Nov. 1976 (BRI); c. 12 km NW of Ban Ban Springs, 25° 30' S, 151° 40' E, *Olsen, M.* 3527 & *Byrnes, N.B.*, 23 May 1977 (BRI); Mount Perry, near Bundaberg, 25° 12' S, 151° 41' E, *Keys, J.* 177, s.dat. (BRI). PORT CURTIS: Pine Mountain, Marlborough Station, 24° 45' S, 149° 50' E, *Batianoff, G.N.* 9805125 & *Ryan, T.*, 14 May 1998 (BRI); Rockhampton, 23° 22' S, 150° 30' E, *Common, I.F.B.* 14, 1 May 1948 (BRI); Great Keppel Island, Big Sandhill Beach, 23° 09' S, 150° 57' E, *Batianoff, G.N.* 9578 & *Dillewaard, H.A.*, 13 Nov. 1987 (BRI); Bundaberg, 24° 52' S, 152° 21' E, *Tenison-Woods, J.E. s.n.*, s.dat. (BRI). WIDE BAY: Fraser Island, 25° 15' S, 153° 10' E, *Epps, F.G. s.n.*, 1 Dec. 1919 (BRI). MORETON: Somerset Dam, Kilcoy Road W side of Dam, 27° 04' S, 152° 33' E, *Grimshaw, P.* 47, 21 Oct. 1993 (BRI); Indooroopilly, 27° 30' S, 152° 58' E, *White, C.T. s.n.*, 14 Nov. 1908 (BRI). NEW SOUTH WALES: New England, *Thozet, A.* 130, s.dat. (MEL).

Distribution. In Australia *Ficus opposita* is restricted to Queensland but extends north to Papua New Guinea. One specimen from MEL indicates a NSW locality and this is the only record of this species in NSW. I could not place the MEL material (*Thozet* 130) with either of the two sandpaper fig species,

Ficus coronata Spin and *Ficus fraseri* Miq., that are recorded by Harden (2000) for NSW. It may represent a valid record or an incorrect citation on the label. (Figure 6)

Habitat. *Ficus opposita* is essentially a woodland species found predominantly in open eucalypt communities and is also commonly encountered in riparian vegetation bordering eucalypt communities. It has also been recorded from deciduous vine thickets, fringes of rain forest and coastal sand dune communities. It has been collected from a variety of soil types including soils derived from basalt, sandstone, granite, limestone, alluvial deposits and serpentine.

Typification. Specimens of *Ficus opposita* Miq., seen by Miquel exist at K and U. The K specimen bears a label in Miquel's hand as well as a tag, presumably in Fraser's hand, that indicates the collection locality, year of collection, name and number. The U specimen is a single leaf and a fragment bag containing an intact syconium. The K specimen is the holotype.

Notes. The leaf image provided by Hyland *et al.*, (2003) under *Ficus opposita* var. *opposita* (Gray B., 4692) is *F. opposita*. The photographs of the male florets (Gray, B., 4776), female florets (Hyland, B.P.H., 13396), transverse section through a syconium (Gray, B., 4515) and female florets (Gray, B., 4515) are *F. opposita*.

Pollinator wasp. The pollinator of *F. opposita* in Australia is *Kradibia nigricorpus* (Girault) and was named apparently from material collected in Queensland (Wiebes 1993).

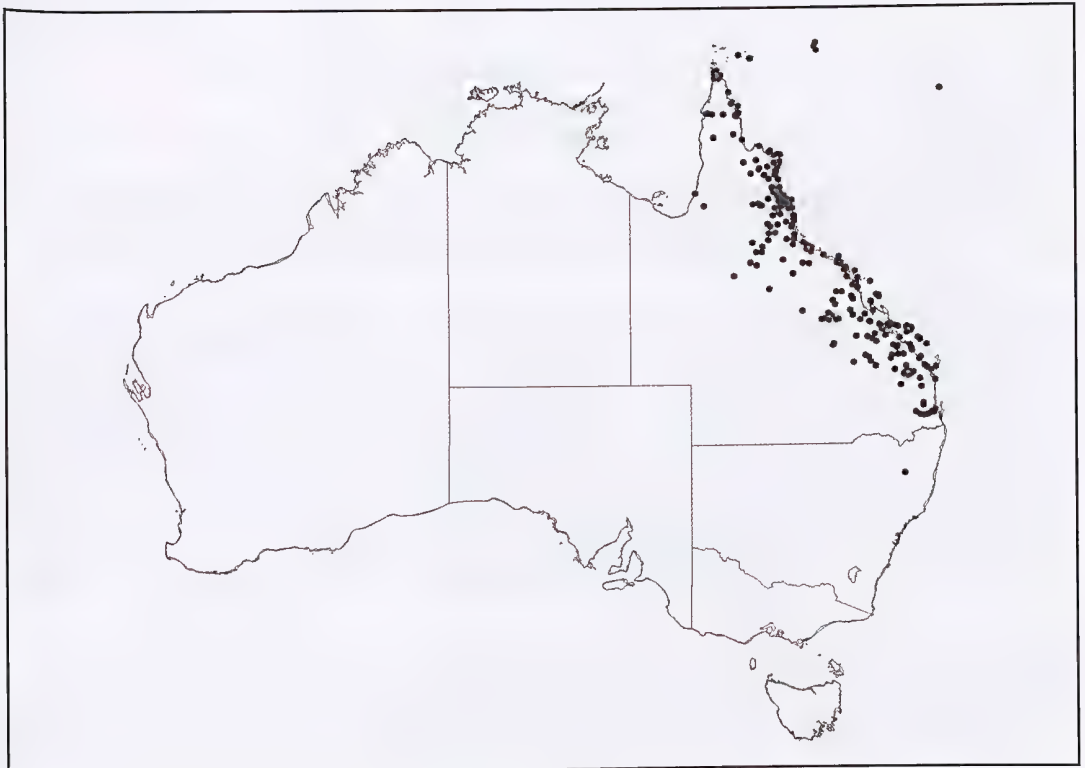


Figure 6. The distribution of *Ficus opposita* in Australia.

Acknowledgements

The following herbaria: BM, BRI, CANB, DNA, K, L, LAE, MEL, NSW, NT, PERTH, PR, QRS, and U kindly provided specimens on loan or bench space during my visits. I thank the Directors and Staff of these institutions, for without access to these valuable collections this research could not have been completed. I would also like to thank the ABLO, Dr Roberta Cowan who examined material at K and the BM in my effort to find type material. Finally, I would like to acknowledge Monika Osterkamp-Madsen as the illustrator.

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